

SYSTEM AND METHOD FOR CONSTRUCTING AND DISPLAYING ACTIVE  
VIRTUAL REALITY CYBER MALLS, SHOW ROOMS, GALLERIES, STORES,  
MUSEUMS, AND OBJECTS WITHIN

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PRIORITY NOTICE

This Non-Provisional U.S. Patent Application claims the benefit of the  
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The present invention is related to constructing panoramic, virtual-reality  
Cyber/Electronic (Cyber) show-rooms, galleries, stores, or malls (show-rooms)  
in electronic media, displaying such cyber shown-rooms on-line on remote  
terminals or client/user computers, allowing the viewers at the computer  
terminals or client/user-computers to select objects displayed in the cyber  
virtual-reality show-rooms on-line, and retrieve and review remote data related  
to the selected objects.

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### Description of Related Art

In the brick-and-mortar world, showrooms, galleries, and stores are used to display furnishing, interior accessories, fashion, art, antiques, or other objects. Shopping centers, malls, and main streets are constructed to aggregate a large number of stores. The on-line equivalent of such commerce components are constructed with database containing information for such objects or stores sorted with nesting categories. The objects in conventional cyber stores, galleries, and show rooms are represented on the client/user computer screens as index lists of textual or thumbnail entries. The stores in a conventional cyber-mall are represented by a collection of "banner" entries (see Figures 1A through 1F). Thumbnails are small graphical representation of an object, serving as an index and a link to detailed information regarding the object. Banner is a small graphical box-like icon with the logo and name of a business entity on the Web. Clicking on a thumbnail usually brings an enlarged photograph and/or descriptions of the object from the server database to the client/user's computer screen. Clicking on a "banner" brings the user to the home page of the business entity the banner represents.

A typical on-line gallery or store, for example, would show category titles of the gallery collections or store items, with some textual entries or graphical thumbnails of selected "featured" exhibits or items. When a particular "last stop" category on a particular categorical path is clicked, the items or objects sorted under that category are presented in an index list of textual one-line

entries or thumbnail entries. The index list could be very long, and partitioned into many web pages (each may be several print pages long), accessible one-web page-at-a-time. Clicking on a textual or thumbnail entry or brings detailed textual description and an enlarged version of the thumbnail, if available, again, only one-at-a-time (see Figure 1).

Virtual Reality software, such as Apple Computing Quick Time, or Macromedia Flash, on the other hand, has been developed to show scrolling panoramic views of a room or a scene, or to rotate a three-dimensional object to show its 360-degree views. The Virtual Reality source data is typically prepared by shooting multiple still photographs of a room, a scene, or an object from sequentially varying angles, and re-compose the still photographs in the correct spatial-time sequence to form a contiguous panoramic view. Video filming can also be used. Viewing the Virtual Reality image at the viewer's computer screen is controlled by the "mouse," a computer input device (See Figure 2), and the control buttons on the VR "viewing window" on the computer screen. The panoramic view of a scene is scrolled across the viewing window. The still shots from sequentially varying angles of a 3-D object is "flashed" onto the VR viewing window, producing an illusion of the object rotating in the window, given a large enough number of still shots, and fast enough speed of spatial-time re-composition or "flashing."

Virtual Reality has not been used in actionable on-line or electronic commerce environment, except for viewing purposes only, such as displaying a

property or a house on-line on Real-Estate listing sites as in Figures 2A, 2B, and 2C; or, rotating a 3-D object, such as a car on car sites; or, for other purely entertainment purposes, such as displaying the content of a museum. In all cases, the Virtual Reality graphical data packet is treated as a single data entity with a single "packet address," accessed by clicking a VR or 3D button, and viewed by controlling the temporal scanning or rotation using the control buttons on the computer screen in conjunction with the button on the input device, the mouse. From within the Virtual Reality data packet, there is no link to the external world outside the data packet. Therefore, there is no practical application other than its visual and entertainment value. One cannot do anything with the Virtual Reality presentation of the known-art, other than looking at it and enjoying it.

#### SUMMARY OF THE INVENTION

The present invention relates to methods and apparatus to construct and display electronic/cyber/on-line showrooms, galleries, stores and malls to emulate the physical brick and mortar world, in addition to the conventional category and index listing e-commerce construct of the Web. Virtual Reality (VR) shots and/or Video films are made to visually present a show room, gallery, store, or object with more resemblance to the physical world we live. Each still picture of the VR shots or each frame of the video film is given a

unique frame address. Each significant and unique object in the VR data packet is given a unique identification, indexed and addressed by the area the object occupies in a picture or a frame. Links are associated with each such object, such that detailed information (such as graphical, video, audio, or textual descriptions) related to the objects stored external to the VR data packet, can be retrieved from the database on demand, when the objects in the VR images are "selected"/"clicked."

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1: Known-Art on-line mall, stores, galleries, and showrooms.

FIG. 1A: The AOL Mall, a collection of department stores represented by banners. Other types of stores are sorted under categories, and accessed through the category listing at the bottom of the page.

FIG. 1B: AOL Apparel Stores listing.

FIGS. 1C1& 1C2: The dEliAs.Com store listed under the AOL Apparel Stores.

FIGS. 1D1 & 1D2: The Artnet.Com Galleries.

FIGS. 1E1 through 1E5: The Ebay home page (1E1), the Ebay Galleries(1E2 through 1E4), and the first print page of the first web-page of a 36 web-page Ebay Furniture listing (1E5).

FIG. 1F: The Design Toscano Cyber Show Room.

FIG. 2: Known-Art Virtual Reality: Virtual touring of a home displayed on the www.bamboo.com web site. There is no other function beyond the visual tour: scrolling the panoramic image to the left, to the right, and look at it.

FIG. 2A: Clicking on the "Exterior Front" selection on the menu at the left side, initiates the downloading of the "panoramic image of the exterior front view of the house from the server database, as noted under the "Bamboo.com/Virtual Tour" logo at the center of the page.

FIG. 2B: When the downloading of the panoramic image is complete, the exterior scene of the home scrolls across the "VR window" on the computer screen. The buttons on the lower left corner of the VR window are control buttons activated by the computer mouse. By moving the cursor to the "left" arrow, and pressing down on the left mouse button, the image scrolls to the left, bringing the portion of the panoramic image beyond the right margin of the window into view. Pressing on the left button of the mouse while the cursor is resting at the "right" arrow, scrolls the image to the right. The "square" button stops the scrolling, and the "b" button is for clicking "back" to the previous page, which is the home page.

FIG. 2C: Clicking on the "Master Bedroom" selection on the menu at the left side of the page, causes the "panoramic" image of the master bedroom, to download from the site-server to the client/user's computer screen. The scrolling and stopping functions are identical to those in FIG. 2B.

FIG. 3: An implementation example of the present invention.

FIG. 3A: The central scene and the primary object of a Virtual Reality presentation of a museum hall. The small buttons at the lower left corner scrolls the panoramic scene of the Hall to the left, right, up, down, and zoom-in, and pan-out.

5 FIG. 3B. The nine Virtual Reality frames around the central object in the hall, scanning from the left of the object through the object, to the right of the object, each assigned its unique frame identity in the present invention.

FIG. 3C. A rectangular area closely surrounding the object is cut, and marked out and identified separately from the rest of the picture/frame. This is  
10 done for Frame B through Frame H in FIG. 3B, where a viewer is likely to want to "click" the object for more information. The rectangular area in all 7 Frames are assigned the same identity representing the object, and the same links to the memory space external to the Virtual Reality data packet, and containing the detailed information related to the object. Clicking within the rectangular area in  
15 all 7 frames results in linking to the same data set.

FIG. 3D. An example of data stored in memory space external to the Virtual Reality data packet, linked to the object image from within the Virtual Reality data packet. Audio read out of stories or descriptions of the object can be linked and presented on demand with the textual, graphical, video, or VR data.  
20 The enlarged still image in this implementation example is further linked to another Virtual Reality data packet that presents the object in 360-degree rotation.

FIG. 3E. Clicking the "Virtual Reality" button in FIG. 3D, brings the "rotating" Virtual Reality data packet of the object to the client/user's computer, with the control buttons at the lower left corner.

FIG. 3F. The 12 of the standard 36 frames shot from equally spaced angles 360-degrees around the object. A larger number shots would permit a smoother and slower rotation. When the number of shots and the speed of rotation, i.e., "flashing-in" the images (into the VR viewing window) are compatible, illusion is that the object rotates on screen.

#### DETAILED DESCRIPTION OF THE EMBODIMENT OF THE INVENTION

The present invention relates to methods and apparatus to construct and display electronic/cyber/on-line showrooms, galleries, stores and malls to emulate the physical showrooms, galleries, stores, and malls. Virtual Reality (VR) shots with audio segments, and/or Video films are made to visually, audibly, and contiguously present a show room, gallery, store, or object. Each still picture of the VR shots or each frame of the video film is given a unique frame address within the VR packet address. Thus, each picture or each frame is identifiable via the address of the packet and the address of the frame. Each significant and unique object in the VR data packet, is given an unique identification, indexed by the area the unique object occupies in the frames or pictures containing the object. Links are assigned to that unique object, which may appear in multiple frames, such that detailed information (such as



graphical, VR, video, audio, or textual descriptions) related to the object addressed by the links, can be retrieved from the database external to the VR data packet, on demand, such as when the object in the proximity frames is "clicked," from any of the proximity frames.

5 Clicking on a particular object in a frame, or in any of the proximity frames in a VR presentation of a show room, gallery, or store, would select the link/links associated with the particular object clicked, and store the links in a file on the client/user computer. Multiple objects can be "clicked," —i.e., selected, within a VR presentation. When the viewing and the selection process is  
10 completed, and the collection of "clicked" links is submitted to the server, by clicking a "submit" button, all data, whether video, audio, VR, graphics, or textual, addressed by the links submitted are brought from the server database to the client/user/user computer with reference to each selected object. In FIG. 3, an example implementation of the present invention is shown. FIG. 3A shows  
15 the central scene about an unique object, Venus of Milo of a Virtual Reality presentation of a museum hall. The small buttons at the lower left corner scrolls the panoramic scene of the Hall to the left, right, up, down, and zoom-in and pan-out. A selected set of nine frames around the "unique object" in this example, are shown in FIG. 3B. The limit of the conventional Virtual Reality of  
20 the known-art is here. There is no interaction or linking mechanism from inside the Virtual Reality images, such as these frames, to data outside of the VR packet.

In our implementation, each frame in the Virtual Reality data packet is given an identification. A unique object that appears in multiple proximity frames would be "cut out" from the rest of each frame, or the scene, and given a unique identification, and assigned a link, or a collection of links, to link to external data storage space that stores data associated with the object. The unique object appearing on several proximity frames, such as from FIG. 3B – Frame B through Frame H, would be identified as one object, and given the same set of links.

A rectangular area closely surrounding the object in all of the proximity frames is cut as shown in FIG. 3C, and marked out and separated from the rest of the frame in order to be assigned a separate and unique identity to the object. This is done for Frame B through Frame H in FIG. 3B. The rectangular area in all 7 Frames are assigned the same identity representing the object, and the same links to the memory space external to the Virtual Reality Frames, containing the detailed information related to the object. Clicking within the rectangular area in all 7 frames results in linking to the same set of data.

FIG. 3D shows an example of data that can be stored in memory space external to the Virtual Reality data-packet, and linked to the object image within the Virtual Reality data packet. Audio read out of stories and descriptions of the an enlarged still image, textual descriptions and actionable "buy" or "bid" functional frames, video, or VR can all be linked and called on demand. In this example, the enlarged still image in FIG. 3D is further linked to another Virtual

Reality data packet that presents the object in 360-degree rotation. Clicking the  
"Virtual Reality" button in FIG. 3D, brings the "rotating" Virtual Reality data  
packet of the object, with the control buttons at the lower left corner. FIG. 3F  
shows the 12 of the standard 36 frames shot from equally spaced angles, 360-  
5 degrees around the object. When the number of shots and the speed of  
sequentially "flashing in" the still images into the viewing window are  
compatible, human eyes perceive that the object rotates on the viewing window.

The invention enables practical and actionable commerce applications of  
Virtual Reality and Video casting or streaming technologies on the web, for  
10 example, in displaying objects in show rooms, galleries, stores, or stores in malls,  
shopping centers, or on main streets in a "real life" format, in addition to the  
conventional categorization, search, and listing presentations in the conventional  
web stores and galleries. The current invention enables object images to be linked  
to additional textual, audio, graphical, video, or VR data stored in the database  
15 outside of the Virtual Reality or Video data packet. Clicking on the image of a  
sofa in such an "active Virtual Reality" show room of this invention for example,  
of an interior furnishing show room, would deposit the links associated with the  
image to a temporary file. When the entire VR or Video presentation is viewed,  
and the selection of multiple interested objects shown in the VR presentation is  
20 completed, the collection of links of the objects selected is submitted to the server  
from the client/user computer, to retrieve data addressed by the submitted links,  
including but not limited to detailed audio or textual descriptions, additional

graphics or VR presentations, pricing information and ordering/ or buying submission mechanism, sorted and presented by each object at command.

The present invention is implemented using software which can be written in many programming languages, or implemented with many web-page generation tools. The present invention can be used on a global or local computer network, on a personal computer, on viewable storage media such as a CD ROM, on a wireless telephone, on a wireless personal assistant such as a Palm Pilot®, or on any type of wired or wireless device that enables digitally stored information to be viewed on a display device. Also, information displayed and viewed using the present invention can be printed, stored to other storage medium, and electronically mailed to third parties.

Numerous modifications to and alternative embodiments of the present invention will be apparent to those skilled to the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the best mode of carrying out the invention. Details of the structure may be varied substantially without departing from the spirit of the invention and the exclusive use of all modifications which come within the scope of the appended claims is reserved.